

**IN THE CLAIMS:**

61 1. (Currently Amended) A humidification apparatus for humidifying a gases flow to be supplied to a patient or other person in need of such gases comprising:

a humidification chamber ~~means~~ and having an inlet and an outlet to allow said gases flow to pass through said humidification chamber ~~means~~,

a chamber ~~heating means~~ heater provided adjacent said humidification chamber ~~means~~ and adapted to vaporise liquid water in said humidification chamber ~~means~~ in order to provide water vapour to said gases flow passing through said humidification chamber ~~means~~,

a conduit ~~gases transportation pathway means~~ connected to said outlet of said humidification chamber ~~means~~ to convey said gases flow to said patient or other person in need of such gases, and

a humidity ~~sensing means~~ sensor configured to provide an indication of the absolute humidity of said gases flow at least at one of said humidification chamber ~~means~~ and at a point along said ~~gases transportation means~~ conduit in said gases flow,

~~control means which receives~~ a controller or processor configured or programmed to receive as inputs said indication of the absolute humidity of said gases flow, ~~and estimates~~ estimate a rate of condensation of said gases in said ~~gases transportation pathway means~~ conduit based on said inputs and ~~controls~~ control said chamber ~~heating means~~ heater based on said rate of condensation to minimise condensation of said gases in said ~~transportation pathway means~~ conduit.

2. (Currently Amended) A humidification apparatus as claimed in claim 1 wherein said ~~gases transportation pathway means~~ conduit includes ~~pathway heating means~~ conduit heater <sup>or side?</sup>

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cont'd to heat said gases flow, and said ~~control means~~ controller or processor is configured to control said ~~transport pathway heating means~~ conduit heater based on said rate of condensation to minimise condensation of said gases in said ~~gases transportation pathway means~~ conduit.

3. (Currently Amended) A humidification apparatus as claimed in claim 2 wherein said humidity ~~sensing means~~ sensor including a first absolute humidity sensor in substantial proximity to said outlet of said humidification chamber ~~means~~.

4. (Currently Amended) A humidification apparatus as claimed in claim 3 wherein said ~~gases transportation pathway means~~ conduit having a patient end, distal to said end connected to said outlet of said humidification chamber ~~means~~, and said humidity ~~sensing means~~ sensor further comprising a second absolute humidity sensor in substantial proximity to said patient end of said ~~gases transportation pathway means~~ conduit.

5. (Currently Amended) A humidification apparatus as claimed in claim 4 wherein said estimate of the rate of condensation is based on the difference between the absolute humidity at said outlet of said humidification chamber ~~means~~, as indicated by the output of said first absolute humidity sensor, and the absolute humidity at said patient end of said ~~gases transportation pathway means~~ conduit, as indicated by the output of said second absolute humidity sensor.

6. (Cancelled)

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7. (Currently Amended) A humidification apparatus as claimed in claim 5 wherein said ~~control means~~ controller or processor is configured to:

i) energise said ~~pathway heating means~~ conduit heater depending on at least said estimate of the rate of condensation, to a level appropriate to substantially vaporise any liquid condensate present in said ~~gases transportation pathway means~~ conduit; and

ii) energise said ~~pathway heating means~~ conduit heater depending on at least said estimate of the rate of condensation, to a level appropriate to minimise any condensation of the vapour from said gases in said ~~gases transportation pathway means~~ conduit.

8. (Original) A humidification apparatus as claimed in claim 7 said steps (i) and (ii) are repeated continually at regular intervals. *trans phase change*

9. (Original) A humidification apparatus as claimed in claim 7 wherein said steps (i) and (ii) are alternated at regular intervals.

10. (Currently Amended) A humidification apparatus as claimed in claim 2 wherein said ~~gases transportation pathway means~~ conduit having a patient end, distal to said end connected to said outlet of said humidification chamber ~~means~~ said humidity ~~sensing means~~ sensor comprising a first temperature sensor in substantial proximity to said outlet of said humidification chamber ~~means~~ and an absolute humidity sensor in substantial proximity to said patient end of said ~~gases transportation pathway means~~ conduit. *no how 2 sep. abs. & temp. sensor*

11. (Currently Amended) A humidification apparatus as claimed in claim 10 further comprising ~~pathway heating means~~ conduit heater adapted to heat said gases flow in said *2nd hum.*

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~~gases transportation pathway means conduit~~ and/or said ~~gases transportation pathway means conduit~~, and said ~~control means controller or processor~~ configured to energise said ~~pathway~~ ~~heating means conduit heater~~ depending on at least said estimate of the rate of condensation, at a level appropriate to minimise any condensation of the vapour from said gases in said ~~gases transportation pathway means conduit~~ as well as convey said gases flow to said patient or other person in need of such gases substantially at a predetermined level of absolute humidity.

12. (Currently Amended) A humidification apparatus as claimed in claim 2 wherein said humidity ~~sensing means sensor~~ comprising at least a temperature sensor and at least one ~~relative humidity sensor~~ *- see 10* providing an indication of the temperature and relative humidity at least at one point in the flow path of said gases flow through said apparatus.

13. (Withdrawn) A humidification apparatus as claimed in claim 2 wherein further comprising flow sensing means adapted to provide an indication of the rate of flow of said gases flown through said apparatus.

14. (Withdrawn) A humidification apparatus as claimed in claim 13 wherein said flow sensing means comprising a heated element adapted to maintain a substantially constant temperature and being provided in the flow path of said gases through said apparatus, the heat loss therefrom providing an indication of the rate of flow of said gases.

15. (Withdrawn) A humidification apparatus as claimed in claims 1 or 2 wherein (said humidity sensing means) further comprising disposable cover means for providing a substantial barrier to microorganisms between said flow of gases and (said temperature sensor.)

16. (Withdrawn) A humidification apparatus as claimed in claims 1 or 2 wherein (said humidity sensing means) further comprising porous disposable cover means for providing porous material as a substantial barrier to microorganisms between said flow of gases and said absolute humidity sensor.

Claims 17-32 (Canceled)

33. (Withdrawn) A humidification apparatus as claimed in claims 17 or 18 wherein said gases transportation pathway means includes insulation means adapted to minimise the rate of heat energy lost by said gases flow in said gases transportation pathway means, said control means adapted to energise said chamber heating means to minimise the condensation of the vapour from said gases in said gases transportation pathway means while providing predetermined levels of absolute humidity.

Claims 34-35 (Canceled)

36. (Withdrawn) A humidification apparatus as claimed in claim 34 wherein said regulated conduit heating means comprising at least one section of negative temperature coefficient material wherein the localised electrical resistance of said section is negatively related to the localised temperature.

37. (Withdrawn) A humidification apparatus as claimed in claim <sup>see 24</sup> (34) wherein said regulated conduit heating means comprising a plurality of sections of positive temperature coefficient material wherein the localised electrical resistance of each said section is positively related to the localised temperature section and at least two electrical conductors running along said gases transportation pathway means, each said conductor being electrically connected to a separate portion of each said section and each said section being electrically isolated from all other sections except for the connection through each said conductor.

38. (Withdrawn) A humidification apparatus as claimed in claim <sup>see 26</sup> (34) wherein said gases transportation pathway means further comprising an inspiratory conduit means in fluid communication with said outlet of said humidification chamber, a connector means in fluid communication with said inspiratory conduit means, a flexible tube extension means in fluid communication with said connector means and patient interface means in fluid communication with said flexible tube extension means adapted to convey said gases flow to said patient.

39. (Withdrawn) A humidification apparatus as claimed in claim <sup>see 14</sup> (38) wherein said flexible tube extension means including flexible tube extension heating means with at least one section of positive temperature coefficient material wherein the localised electrical resistance of said material is positively related to the localised temperature

40. (Withdrawn) A humidification apparatus as claimed in claims <sup>see 31</sup> (38 or 39) wherein said patient interface means comprising patient interface heating means including at least one

section of positive temperature coefficient material wherein the localised electrical resistance of each said section of said material is positively related to the localised temperature.

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41. (Withdrawn) A humidification apparatus as claimed in claim <sup>See 36</sup> (34) further comprising humidity sensing means for providing an indication of the absolute humidity of said gases flow at said outlet of said humidity chamber means.

42. (Withdrawn) A humidification apparatus as claimed in claims <sup>See 36</sup> (41) wherein further comprising temperature sensing means for providing an indication of the temperature of said gases flow at said outlet of said humidity chamber means.

43. (Withdrawn) A humidification apparatus as claimed in claim <sup>See 36</sup> (34) wherein said gases transportation pathway means comprising a double walled inspiratory conduit and said regulated conduit heating means comprising the provision of warm fluid circulated between the inner wall and outer wall of said double walled inspiratory conduit.

44. (Withdrawn) A humidification apparatus as claimed in claims <sup>See 36</sup> (34) wherein said predetermined profile relates to a substantially constant temperature along the length of said gases transportation pathway means.

45. (Withdrawn) A humidification apparatus for humidifying a gases flow to be supplied to a patient or other person in need of such gases comprising:

humidification chamber means and having an inlet and an outlet to allow said gases flow to pass through said humidification chamber means,

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and  
chamber heating means provided adjacent said humidification chamber means and adapted to vaporise liquid water in said humidification chamber means in order to provide water vapour to said gases flow passing through said humidification chamber means, and chamber manifold means including mounting means in use housing at least one sensing means in proximity to said outlet of said humidification chamber means to connect:

said inlet of said humidification chamber means to a supply conduit means said supply conduit means in use in fluid communication with a gases supply means for supplying said gases flow at a desired pressure, and/or

said outlet of said humidification chamber means to a gases transportation pathway means for conveying said gases flow to said patient or other person in need of such gases.

46. (Withdrawn) A humidification apparatus as claimed in claim 45 wherein said chamber manifold means further including chamber manifold heating means adapted to heat said gases flow through said chamber manifold means and/or said chamber manifold means.

47. (Withdrawn) A humidification apparatus as claimed in claims 45 or 46 wherein said chamber manifold means is attachable to and removable from said humidification chamber means.

48. (New) A method for humidifying a gases flow to be supplied to a patient or other person in need of such gases comprising:

transferring water vapour or humidity to gases passing through a chamber,

conveying said gases flow to said patient or other person in need of such gases from said chamber, and



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sensing the absolute humidity of said gases flow (at least one at one point) along its flow path, estimating a rate of condensation of said gases based on said absolute humidity and controlling the transferred humidity based on said rate of condensation to minimise condensation of said gases.

49. (New) A method as claimed in claim 48 further comprising the step of heating said gases flow at least at one point along its flow path, and controlling the transferred heat based on said rate of condensation to minimise condensation of said gases.

50. (New) A method as claimed in claim 49 wherein said absolute humidity is sensed in substantial proximity to (said outlet) of said chamber.

51. (New) A method as claimed in claim 50 wherein said absolute humidity is also sensed in substantial proximity to a patient.

52. (New) A method as claimed in claim 51 wherein said estimate of the rate of condensation is based on the difference between the absolute humidity at said outlet of said chamber, and the absolute humidity at said patient.

53. (New) A method as claimed in claim 52 further comprising the steps of:

i) heating said gases flow depending on at least said estimate of the rate of condensation, to a level appropriate to substantially vaporise any liquid condensate; and

ii) heating said gases flow depending on at least said estimate of the rate of condensation, to a level appropriate to minimise any condensation of the vapour from said gases.

54. (New) A method as claimed in claim 53 said steps (i) and (ii) are repeated continually at regular intervals.

55. (New) A method as claimed in claim 53 wherein said steps (i) and (ii) are alternated at regular intervals.

56. (New) A method as claimed in claim 49 wherein the temperature of said gases is sensed in substantial proximity to the outlet of said chamber and the absolute humidity is sensed in substantial proximity to said patient.

57. (New) A method as claimed in claim 56 further comprising the steps of heating said gases, and controlling the transferred heat depending on at least said estimate of the rate of condensation, at a level appropriate to minimise any condensation of the vapour from said gases as well as convey said gases flow to said patient or other person in need of such gases substantially at a predetermined level of absolute humidity.

58. (New) A method as claimed in claim 49 wherein the temperature and relative humidity at least at one point in the flow path of said gases flow is sensed.

59. (New) A humidification apparatus for humidifying a gases flow to be supplied to a patient or other person in need of such gases comprising:

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a humidification chamber and having an inlet and an outlet to allow said gases flow to pass through said humidification chamber,

a chamber heater provided adjacent said humidification chamber and adapted to vaporise liquid water in said humidification chamber means in order to provide water vapour to said gases flow passing through said humidification chamber,

a conduit connected to said outlet of said humidification chamber to convey said gases flow to said patient or other person in need of such gases, and

a humidity sensor configured to provide an indication of the absolute humidity of said gases proximate said outlet,

a controller or processor configured or programmed to receive as inputs said indication of the absolute humidity of said gases flow, and energise said chamber heater based on said absolute humidity to achieve a predetermined absolute humidity at said outlet, and configure or programmed such that said predetermined absolute humidity substantially avoiding condensation in said conduit.